CLAIMS

1. (Canceled)

2. (Currently amended) The frequency domain equalization system of claim ~~1~~ 5 where~~in said~~ the complex signal comprises 52 complex subcarriers.

3. (Currently amended) A ~~The~~ frequency domain equalization system ~~of claim 2~~ to compensate for wireless communication time-constant and time-varying channel effects, residual carrier frequency offset, and sampling frequency offset arising in a received complex signal comprising:

an equalizer tap calculation circuit cooperating with an equalizer tap tracking circuit to correct the time-constant and time-varying channel effects;

a phase tracking circuit to correct the residual carrier frequency offset; and

a timing tracking circuit to correct the sampling frequency offset;

where the received complex signal is inputted from a Fast Fourier Transform (FFT) circuit and a corrected complex signal is outputted to a soft decision demapper;

where the equalizer tap calculation circuit is configured to generate a corrective tap signal to use in correcting the complex signal;

where pilot signals are extracted for use in the phase and timing tracking circuits;

where the complex signal comprises 52 complex subcarriers; and

where~~in said~~ the corrective tap signal is generated by applying a sign least mean squares algorithm to ~~said~~ the 52 complex subcarriers.

4. (Currently amended) The frequency domain equalization system of claim 3 where~~in said~~ the equalizer tap tracking circuit further includes a slicer and where~~in said~~ the equalizer tap tracking circuit updates ~~said~~ the corrective tap signal with a running time average of a slicer error.

5. (Currently amended) A ~~The~~ frequency domain equalization system ~~of claim 1~~ to compensate for wireless communication time-constant and time-varying channel effects, residual

carrier frequency offset, and sampling frequency offset arising in a received complex signal comprising:

an equalizer tap calculation circuit cooperating with an equalizer tap tracking circuit to correct the time-constant and time-varying channel effects;

a phase tracking circuit to correct the residual carrier frequency offset; and

a timing tracking circuit to correct the sampling frequency offset;

where the received complex signal is inputted from a Fast Fourier Transform (FFT) circuit and a corrected complex signal is outputted to a soft decision demapper;

where the equalizer tap calculation circuit is configured to generate a corrective tap signal to use in correcting the complex signal;

where pilot signals are extracted for use in the phase and timing tracking circuits; and

where~~in~~ respective corrective tap signals are calculated for each subcarrier associated with ~~said~~ the received complex signal.

6. (Currently amended) A ~~The~~ frequency domain equalization system ~~of claim 1~~ to compensate for wireless communication time-constant and time-varying channel effects, residual carrier frequency offset, and sampling frequency offset arising in a received complex signal comprising:

an equalizer tap calculation circuit cooperating with an equalizer tap tracking circuit to correct the time-constant and time-varying channel effects;

a phase tracking circuit to correct the residual carrier frequency offset; and

a timing tracking circuit to correct the sampling frequency offset;

where the received complex signal is inputted from a Fast Fourier Transform (FFT) circuit and a corrected complex signal is outputted to a soft decision demapper;

where the equalizer tap calculation circuit is configured to generate a corrective tap signal to use in correcting the complex signal;

where pilot signals are extracted for use in the phase and timing tracking circuits; and

where~~in said~~ the equalizer tap calculation circuit ~~also performs~~ is configured to perform spectral smoothing.

7. (Currently amended) The frequency domain equalization system of claim ~~1~~ 5 wherein said timing tracking circuit tracks the phases of said pilot signals using time averaging.

8. (Currently amended) A ~~The~~ frequency domain equalization system ~~of claim 2~~ to compensate for wireless communication time-constant and time-varying channel effects, residual carrier frequency offset, and sampling frequency offset arising in a received complex signal comprising:

an equalizer tap calculation circuit cooperating with an equalizer tap tracking circuit to correct the time-constant and time-varying channel effects;

a phase tracking circuit to correct the residual carrier frequency offset; and

a timing tracking circuit to correct the sampling frequency offset;

where the received complex signal is inputted from a Fast Fourier Transform (FFT) circuit and a corrected complex signal is outputted to a soft decision demapper;

where the equalizer tap calculation circuit is configured to generate a corrective tap signal to use in correcting the complex signal;

where pilot signals are extracted for use in the phase and timing tracking circuits;

where the complex signal comprises 52 complex subcarriers; and

where~~in~~ a respective phase and timing rotor is applied to said pilots and ~~said~~ the 52 complex subcarriers ~~for correction of said~~ to correct the received complex signal.

9. (Currently amended) A ~~The~~ frequency domain equalization system ~~of claim 1~~ to compensate for wireless communication time-constant and time-varying channel effects, residual carrier frequency offset, and sampling frequency offset arising in a received complex signal comprising:

an equalizer tap calculation circuit cooperating with an equalizer tap tracking circuit to correct the time-constant and time-varying channel effects;

a phase tracking circuit to correct the residual carrier frequency offset; and

a timing tracking circuit to correct the sampling frequency offset;

where the received complex signal is inputted from a Fast Fourier Transform (FFT) circuit and a corrected complex signal is outputted to a soft decision demapper;

where the equalizer tap calculation circuit is configured to generate a corrective tap signal to use in correcting the complex signal;

where pilot signals are extracted for use in the phase and timing tracking circuits; and

where~~in~~ four pilot signals are calculated.

10. (Currently amended) A ~~The~~ frequency domain equalization system ~~of claim 1~~ to compensate for wireless communication time-constant and time-varying channel effects, residual carrier frequency offset, and sampling frequency offset arising in a received complex signal comprising:

an equalizer tap calculation circuit cooperating with an equalizer tap tracking circuit to correct the time-constant and time-varying channel effects;

a phase tracking circuit to correct the residual carrier frequency offset; and

a timing tracking circuit to correct the sampling frequency offset;

where the received complex signal is inputted from a Fast Fourier Transform (FFT) circuit and a corrected complex signal is outputted to a soft decision demapper;

where the equalizer tap calculation circuit is configured to generate a corrective tap signal to use in correcting the complex signal;

where pilot signals are extracted for use in the phase and timing tracking circuits; and

where~~in said~~ the phase tracking circuit is nested within ~~said~~ the timing tracking circuit.

11. (Canceled)

12. (Currently amended) A ~~The~~ method ~~of claim 11~~ for correcting a received complex signal, comprising:

estimating a channel response from long sequence training symbols FFT 1 and FFT 2 contained in a received data packet preamble;

processing pilot tones in each of the FFT 1 and FFT 2 long sequence training symbols to evaluate a carrier frequency offset and a sampling frequency offset;

compensating for the carrier frequency offset or the sampling frequency offset in a subsequently received data packet;

tracking channel distortion during subsequent reception of data packets; and

modifying the channel response to compensate for any detected distortion;

where~~in said step of channel estimation is performed by~~ estimating the channel response includes comparing the received amplitude and phase of ~~said~~ the long sequence training symbols FFT 1 and FFT 2 with a reference.

13. (Currently amended) The method of claim 12 where~~in said step of~~ the comparing the received amplitude ~~further comprises~~ includes averaging over ~~said~~ the long sequence training symbols FFT 1 and FFT 2 and demodulating each subcarrier associated with ~~said~~ the received complex signal.

14. (Currently amended) A ~~The~~ method ~~of claim 11~~ for correcting a received complex signal, comprising:

estimating a channel response from long sequence training symbols FFT 1 and FFT 2 contained in a received data packet preamble;

processing pilot tones in each of the FFT 1 and FFT 2 long sequence training symbols to evaluate a carrier frequency offset and a sampling frequency offset;

compensating for the carrier frequency offset or the sampling frequency offset in a subsequently received data packet;

tracking channel distortion during subsequent reception of data packets; and

modifying the channel response to compensate for any detected distortion;

where~~in said step of~~ the estimating ~~further comprises~~ the channel response includes producing a corrective tap signal and applying ~~said~~ the corrective tap signal to ~~said~~ the received long sequence training symbols FFT I and FFT 2.

15. (Currently amended) The method of claim 14 where~~in said step of~~ the tracking ~~comprises~~ includes refining ~~said~~ the corrective tap signal by tracking residual phase and timing error, and channel variations.

16. (Currently amended) The method of claim 14 where~~in said step of~~ the estimating ~~further comprises~~ includes spectral smoothing.

17. (Currently amended) A ~~The~~ method ~~of claim 11~~ for correcting a received complex signal, comprising:

estimating a channel response from long sequence training symbols FFT 1 and FFT 2 contained in a received data packet preamble;

processing pilot tones in each of the FFT 1 and FFT 2 long sequence training symbols to evaluate a carrier frequency offset and a sampling frequency offset;

compensating for the carrier frequency offset or the sampling frequency offset in a subsequently received data packet;

tracking channel distortion during subsequent reception of data packets; and

modifying the channel response to compensate for any detected distortion;

where~~in said step of~~ the compensating ~~further comprises~~ includes applying respective phase and timing rotors to ~~said~~ the pilots and subcarriers associated with ~~said~~ the received complex signal to correct ~~said~~ the respective carrier frequency and sampling frequency offsets.

18. (Currently amended) The method of claim 17 where~~in said step of~~ processing the pilot tones ~~further comprises~~ includes tracking the phase across ~~said~~ the pilot tones using time averaging.

19. (Currently amended) A ~~The~~ method ~~of claim 11~~ for correcting a received complex signal, comprising:

estimating a channel response from long sequence training symbols FFT 1 and FFT 2 contained in a received data packet preamble;

processing pilot tones in each of the FFT 1 and FFT 2 long sequence training symbols to evaluate a carrier frequency offset and a sampling frequency offset;

compensating for the carrier frequency offset or the sampling frequency offset in a subsequently received data packet;

tracking channel distortion during subsequent reception of data packets; and

modifying the channel response to compensate for any detected distortion;

where~~in said step of~~ the processing the pilot tones ~~further comprises~~ includes sampling ~~said~~ the received complex signal at an analogue to digital converter (ADC) with a clock

associated with ~~said~~ the digital receiver and determining a difference in clock frequency between ~~said~~ the digital receiver clock and a clock associated with a transmitter.